

follows :—At the present time glaciers enter the sea, within the northern hemisphere, down to the latitude of 60° ; the sea is frozen and ice-marks are produced on the shore as far south as 40° ; and icebergs drop their rocky burdens within 37° degrees of the equator. If there ever prevailed a universal glacial period with a general reduction in the temperature of the whole northern hemisphere, we ought to find traces of glacial action everywhere round the whole globe and extending even to more southern latitudes than 37° . If the ice-cap “ever existed, the marks of it ought to be found on all meridians alike. If ever there was a glacial period in our world, glacial marks ought to be found everywhere, in the same latitudes and at the same levels, in the same state of preservation.”

Keeping these premises constantly before his mind, our author found, during his journey of eleven months, quite sufficient evidence to cause him to make a full retraction of his former conclusions on the subject. As far as Chicago he observed everywhere the most striking traces of former glacial action; but in the same latitudes to the westward he found these marks of old glaciers entirely disappearing; and although some signs of glacial action were detected in the Rocky Mountains themselves, yet from this great range onwards to Ceylon they were found to be wholly wanting. Mr. Campbell's previous expedition in eastern Europe had led him to conclusions as to the *local* character of glacial action which were quite in harmony with those obtained in this journey round the globe, and he enunciates the results of his latest observations upon the subject as follows :—“Whether I take marks which can be explained by glacial erosion, such as firths, valleys, lakes, &c., or marks which clearly are not glacial, such as peaks and canons, I find nothing to suggest a general glacial period in America or in Europe;” and he further proceeds to state that he can find no evidence whatever of a recurrence of universal glacial periods such as might result from the action of some astronomical cause.

We have already extended this notice of Mr. Campbell's valuable work to the farthest limits, and must refer to the book itself for the details of the evidence on which his conclusions are founded.

In bringing our remarks to a close, we may add that the author's present views on the influence produced on climate by the changes of level in different districts, resulting in alterations in the direction of ocean currents, &c., appear to be quite in harmony with those so long and firmly maintained by Lyell, in opposition to the cosmical theories of the extreme glacialists. His observations on Western North America are fully confirmed by the more detailed examination of the districts by several of the United States' geologists; and his conclusion that there is no evidence of the former existence of a general “Glacial period” are quite in accordance with those enunciated by Dr. Hector and other observers who have studied the glaciers of the southern hemisphere. Prof. Nordenskjöld has, moreover, shown how completely palæontological evidence of the clearest character disposes of the notion of frequently recurring glacial epochs in past geological times.

We cannot but admire the candour with which Mr. Campbell renounces his previously-expressed opinions; and we may, perhaps, be allowed to express a hope that

the facts and arguments which have led him to so greatly modify his views on glacial phenomena, will not be without effect on the minds of others, who, like him, have certainly pushed their conclusions derived from a study of very limited portions of the earth's surface, to generalisations far beyond what those observations can be legitimately made to support.

J. W. J.

SCLATER'S “GEOGRAPHICAL ZOOLOGY”

On the Present State of our Knowledge of Geographical Zoology. By P. L. Sclater, M.A., F.R.S. Being the Presidential Address delivered to the Biological Section of the British Association. (London, Printed by Taylor and Francis: 1875.)

WE have received a copy of Mr. Sclater's address as President of the Biological Section of the British Association, at its meeting last year, at Bristol. At the time when it was delivered we had the opportunity of presenting it in full to our readers (*vide* NATURE, vol. xii. p. 374, *et. seq.*). In the independent form now under notice it has added to it a most important appendix, namely, a list of all the works and memoirs referred to in its various sections. When we say that these are more than 420 in number, a fair estimate may be formed of the labour which must have been involved in their collection and classification. Exact references are a most valuable aid to biological research, and prevent the waste of much time during special investigations, and on the subject of the geographical distribution of vertebrated animals, this address of Mr. Sclater supplies all that can be wanted by anyone either reviewing the subject as a whole, or desiring to obtain the best information on the zoology of any special locality.

The arrangement adopted is regional, the basis being the universally accepted divisions proposed by Mr. Sclater himself. They are thus tabulated :—

I.—Palæarctic Region . . .	} <i>Arctogaea.</i>
II.—Ethiopian Region . . .	
IIIa.—Lemurian Sub-region . . .	
III.—Indian Region . . .	
IV.—Nearctic Region . . .	} <i>Dendrogaea.</i>
V.—Neotropical Region . . .	
Va.—Antillean Region . . .	} <i>Antarctogaea.</i>
VI.—Australian Region . . .	
VII.—Pacific Region . . .	<i>Ornithogaea.</i>

Each of these regions is divided into sub-regions, which are described separately. Perhaps no better idea can be formed of the extent to which the greater divisions of the globe have been studied, than by a comparison of the number of works and memoirs which have appeared with reference to each, or to parts of each. As might be premised, there has been much written on the animals of the Palæarctic region, considering that it includes Europe, together with North Africa, Siberia, and North China. There are 119 references with regard to it, the most recent including Prof. Lilljeborg's work on the Mammals of Sweden and Norway, Mr. Dresser's “Birds of Europe,” Mr. J. Hancock's “Birds of Northumberland and Durham,” Dr. Schreiber's “Herpetologia Europaea,” the German translation of Dr. N. Severzow's work on the Birds of Turkestan, the late Dr. Stoliczka's “Avifauna of Kashgar in Winter,” Lieut.-Colonel Irby's “Ornithology of the Straits of Gibraltar,” and the new edition of Bell's “British Quadrupeds.”

With respect to the Ethiopian region—the field-work of Sir Andrew Smith, Livingstone, and Du Chaillu—46 are mentioned, and 40 on the Indian region, which has been so much investigated by those who, from other reasons, have had to take up their residence in our Eastern empire. There are 25 works referred to respecting the Nearctic region, and as many as 138 on the Neotropical, which demonstrates how rich a field South America has proved to the students of biology, it being remembered that Mr. Darwin himself obtained the bulk of his practical experience of animal life in that continent. Forty-one works on the Australian and nine on the Pacific region include the remainder of the list. Mr. Sharpe's edition of Layard's "Birds of South Africa," Mr. Hume's "Stray Feathers," Lord Walden's Memoirs on the Birds of Celebes and the Philippines, Mr. Scammon's "Marine Mammals of the North-Western Coast of North America," Messrs. Baird, Brewer, and Ridgway's "History of North American Birds," Dr. E. Coues' "Birds of the North-West," Prof. T. R. Jones' "Manual of the Natural History, Geology, and Physics of Greenland," Messrs. Sclater and Salvin's "Nomenclator Avium Neotropicalium," Mr. A. W. Scott's "Elementary Treatise on the Mammals of New South Wales," the late Mr. J. Brenchley's "Cruise of the *Curaçoa*," Dr. Buller's "Birds of New Zealand," being the most important works which have appeared during the last two or three years, on the regions other than the Palearctic, above referred to.

That several works have appeared since Mr. Sclater's address was delivered—including, among the most important, the late Mr. Blyth's "Catalogue of the Mammals and Birds of Burmah," edited by Dr. J. Anderson, Dr. Dobson, Lord Walden, and Mr. Grote, a special notice of which we hope very shortly to give—and that Mr. Wallace's important two volumes on the "Geographical Distribution of Animals" may be expected very soon, shows how much stress is now being laid on the fauna of different regions, and adds further to the importance and value of the encyclopædic address, the contents of which we have brought before the notice of our readers on the present occasion.

OUR BOOK SHELF

An Elementary Treatise on Curve Tracing. By Percival Frost, M.A. (London: Macmillan and Co., 1872.)

On the Transcendental Curve whose Equation is—

$$\sin y \sin my = a \sin x \sin nx + b.$$

By H. A. Newton and A. W. Phillips. (From the *Transactions of the Connecticut Academy*, vol. iii., 1875.)

MR. FROST'S work is an elementary one, inasmuch as no advanced acquaintance with the differential and integral calculus is required; nor do his methods turn upon the higher algebra, nor upon the science of projections. Indeed he is careful to restrict himself for the most part to fairly elementary processes. It is not a complete treatise, as he does not touch upon roulettes or upon curves, given by intrinsic equations. These latter curves have been, as is well known, discussed and fully illustrated in the late Dr. Whewell's two memoirs in the *Cambridge Philosophical Transactions* (vols. viii. and ix.) We miss, too, all account of curves of historical interest. Occasional notices of these have been given by different writers, but we should like a sketch of them drawn up by some competent hand, with an account of their origin and applications.

Reasons have weighed with Mr. Frost in making these omissions, and we do not grumble at his taking his own line in his treatment of the subject as he has given us a full treatise, abundantly illustrated by figures, of curves, ranging from simplicity to considerable complexity of form. The preface is an interesting one (though by the way, the author was rather unwilling to write it), and in it attention is called to the fact, among other reasons, why junior students should devote some little time to curve-tracing, that the subject of graphical calculation is coming more into use, being applied to problems in statics (see Culmann's "Graphische Statik"), engineering, and crystallography.

We cannot here give any detailed sketch of the contents of the work, further than to draw attention to the last chapter, which treats of the inverse problem, viz., given the form of a curve to investigate its equation, or an approximation to it. We do not remember to have seen the attempt made elsewhere. Should the subject be taken up and carried on with success, we may look for the equation to one's name taking the place of the name on an address card.

The majority of the curves discussed and traced in Mr. Frost's book are algebraical ones.

Messrs. Newton and Phillips write that from the form of a transcendental curve it is not easy to state the equation that will represent it. So instead of taking up the inverse problem, they have selected from out of the host of transcendental equations, and exhibit twenty-four pages of plates of the plane curves furnished by assigning different values to the constant quantities a , b , m , and n in the equation given above.

These forms, as might be imagined, are all symmetrical, and much resemble carpet patterns. The tract is an interesting evidence of the patience and skill at draughtsmanship of the authors.

Kurzes Chemisches Handwörterbuch zum Gebrauche für Chemiker, Techniker, Aerzte, Pharmaceuten, Landwirthe, Lehrer, und für Freunde der Naturwissenschaft überhaupt. Bearbeitet von Dr. Otto Dammer. (Berlin: Robert Oppenheim, 1876.)

To keep pace with the rapid growth of chemical science would be almost a hopeless task, were it not for the literary organisation and classification undertaken from time to time by such writers as the author of Watts's "Dictionary of Chemistry," and Dr. Dammer, the compiler of the present volume. To writers of this class who take upon themselves the laborious drudgery of "stock-taking," workers in the ranks of science owe a debt of gratitude which cannot be too highly estimated.

In coupling together the names of Mr. Watts and Dr. Dammer, it is by no means our intention to imply any similarity between the respective "dictionaries." Dr. Dammer's work is perhaps more truly a dictionary in the proper signification of the term than Mr. Watts's seven volumes, for while the latter contain full, and in many cases, exhaustive information on the various subjects treated of, the whole of the former is comprised in one volume royal octavo, of some eight hundred pages. The justly esteemed "dictionary" of English chemists need fear, therefore, no rival in the present volume, the two works rather bearing to each other the relationship of a chemical encyclopædia to a glossary of chemical terms.

The longest articles in the present volume are those on absorption, equivalents, alum, ammonia, aniline, aromatic bodies, ashes, animal respiration, atmosphere, atom, base, benzoic acid, benzene, succinic acid, beer, blood, soils, bread, chemistry, chromic acid, steam, diffusion, albumin, electricity, petroleum, nutrition of plants and of animals, acetic acid, acetates, colouring matters, fats, flesh, galvanic batteries, gases, tan, glass, coal, hydrocarbons, madder, crystal, copper, illuminating gas, solution, magnetism, metals, metalloids, microscope,